

Conrad C. Lautenbacher, Jr.

Retired Navy Vice Admiral Conrad C. Lautenbacher, Ph.D., serves as Chief Executive Officer and Director for GeoOptics, Inc., a startup company with the initial goal of launching and operating the first commercial Radio Occultation (RO) satellite constellation designed for the express purpose of collecting and offering weather data and associated services as a commercial enterprise. Most recently, as Vice President, Science Programs, Applied Technology Group (ATG) of CSC Corp. he was engaged in business development activities to expand opportunities in science and technical support operations.

He previously served as Under Secretary of Commerce for Oceans & Atmosphere and Administrator of the National Oceanic and Atmospheric Administration (NOAA) for seven years. Prior to that, he was President and CEO of the Consortium for Oceanographic Research and Education (CORE), now known as the Consortium for Ocean Leadership. Before joining CORE, Dr. Lautenbacher formed a consulting business, CEREBRUM, Inc. and worked principally for defense industries.

Notable navy assignments included Commander US Third Fleet, Deputy Chief of Naval Operations (Resources, Warfare Requirements and Assessments), Director of J-8 (Resources) on the Joint Staff., Commander Naval Station Norfolk, the Navy's largest naval station, Commanding Officer of USS HEWITT (DD-966), Commander Cruiser Destroyer Group Five, and Commander, Naval Forces, Riyadh during Operation Desert Storm.

He holds Master of Science and Ph.D. degrees from Harvard University in Applied Mathematics and is a graduate of the US Naval Academy (Class of 1964).

**Written Testimony before the
U.S. House of Representatives, Space, Science and Technology Committee,
Subcommittee on Environment and Subcommittee on Space and Aeronautics**

**Joint Hearing Entitled:
“Space Weather: Advancing Research, Monitoring, and Forecasting Capabilities”**

**Dr. Conrad C. Lautenbacher, Jr., VADM USN (Ret.),
Chief Executive Officer -- GeoOptics, Inc.
Executive Committee Member -- American Commercial Space Weather Association**

October 23, 2019

Good Afternoon -- Chairman Fletcher and Chairman Horn, Ranking Members Marshall and Babin and distinguished Members of the Subcommittee, it is my honor to appear before you today at this important hearing to discuss Advancing Research, Monitoring, and the Forecasting Capabilities for Space Weather.

GeoOptics has been fulfilling its NOAA NESDIS contract under the Commercial Weather Data Pilot (CWDP) program and has successfully delivered over 350,000 high data accuracy GPS-Radio Occultation profiles by the end of September 2019. Having successfully demonstrated our data, we look forward to NOAA NESDIS soon announcing its Commercial Data Buy Program.

Our success in demonstrating our technological capability to NOAA NESDIS would not have been possible without the leadership and support of many on this committee and especially Congressman Frank Lucas, Congresswoman Suzanne Bonamici and former Congressman Jim Bridenstine for their support of the Commercial Weather Data Program in the Weather Research and Forecast Innovation Act of 2017.

Our founder Tom Yunck originally proposed the GPS-RO technique in 1988 and oversaw the development and improvement of the world's leading capability at the Jet Propulsion Laboratory. Over the last decade a series of government-funded satellites have refined the RO technology and proven out its tremendous capability. GeoOptics' CICERO (Community Initiative for Cellular Earth Remote Observation) nano-satellites is the only US-based RO provider with "the JPL gold standard" for some of the most accurate weather and climate data available, offering significantly more impact per measurement than traditional weather instruments.

We have worked with our partners at the Jet Propulsion Laboratory and Tyvak Nano-Satellite Systems to commercialize and miniaturize this technology. By launching smaller, less expensive satellites, we will be able to make orders of magnitude more data available to weather forecasters and scientists around the world. And, our pledge to the scientific community is that all is CICERO data will be provided free for any research purpose.

Radio Occultation data provides high-resolution temperature and water vapor profiles by gaining measurements of bending angle profiles in the troposphere and the stratosphere with high vertical resolution and accuracy. The measurement of bending angles can be used to obtain information on refractivity profiles, which can be used to retrieve atmospheric temperature and humidity profiles, as well as surface pressure. A secondary objective is to provide space-weather information through measurement of electron density and its profile in the middle and high atmosphere.¹

There is a robust interest from other private sector / space weather technology companies to work with federal agencies to develop and implement solutions to deal with Space Weather. For example, GeoOptics is a member of the American Commercial Space Weather Association (ACSWA), which is comprised of 19 member companies with the common goal of developing, delivering, and sustaining key space weather products and services to mitigate threats to societal infrastructure. ACSWA plays an essential role in the academic-governmental-commercial triad that forms the space weather enterprise. ACSWA companies provide the insight, innovation, and cost-benefit to our Nation's preparedness and responsiveness to space weather threats.²

ACSWA is a collective voice for the commercial space weather sector and an advocate for the enterprise. Since its inception in 2010 beginning with five companies, ACSWA has quadrupled in size. ACSWA serves as a catalyst for collaboration between various organizations and the commercial space weather industry. ACSWA works with government agencies, academia, and industry stakeholders to strengthen the space weather enterprise and to promote space weather, space weather partnerships, and public/commercial initiatives.

Last year NOAA NESDIS issued its final report of the NOAA Space Platform Requirements Working Group (SPRWG) in support of the NOAA Satellite Observing System Architecture (NSOSA) study. As a part of this study, NESDIS initiated the Space Platform Requirements Working Group (SPRWG) to evaluate the future needs and relative priorities for weather, space weather and environmental remote sensing (excluding land mapping) space-based observations for the 2030 timeframe and beyond.³

One has only to look at the ranking of the space weather measurements that were identified by leading NOAA and university research scientists in the SPRWG Report and compare them to the technological capabilities offered by ACSWA member companies.⁴

Increased investments are needed from Congress to continue to fund the Commercial Data Buy Program for GPS-RO data that benefit Nowcasting and Numerical Weather Prediction.

¹<https://www.eumetsat.int/website/home/Satellites/FutureSatellites/EUMETSATPolarSystemSecondGeneration/RO/index.html>

² <http://www.acswa.us/about.html>

³ https://www.nesdis.noaa.gov/sites/default/files/SPRWG_Final_Report_20180325_Posted.pdf.

⁴ <http://www.acswa.us/capabilities.html>

Congress should also consider creating a Commercial Space Weather Data Program for commercial sector providers to provide cost effective solutions for the challenges of Space Weather as defined in the NOAA SPRWG Report.

Jet Propulsion Laboratory and California Institute of Technology scientists⁵ recommended: “...Cubesat swarms, either as a dedicated constellation or an ad-hoc constellation deployed via launches of opportunity, would be a profoundly useful resource for advancing Atmosphere-Ionosphere-Magnetosphere science, providing plasma measurements to accompany other measurements of the forces that influence ionospheric structure such as solar extreme ultraviolet radiation (EUV), thermo-spheric winds and composition, and ionospheric electric fields.” That was written in 2010 and many of these recommendations are included in the recommendations of NOAA SPRWG Report that was issued in 2018.

My esteemed panelists could better answer this point, but if the United States were to suffer a huge coronal mass ejection like the 1859 Carrington Event in Missouri, conservative estimates would be around \$20 Trillion for the US to manage the destruction from a massively crippling solar storm on our electronic infrastructure⁶. Therefore, it is critically important in the Nation’s vital self-interest to find solutions to the challenges of Space Weather that could adversely affect life here on Earth.

The American Commercial Space Weather Association and its member companies look forward to working with federal agencies advance their knowledge and understanding of Space Weather.

Thank you for your consideration. I will do my best to address any questions that you may have.

⁵ GNSS1 Geospace Constellation (GGC): A Cubesat Space Weather Mission Concept Anthony J. Mannucci, Jeff Dickson, Coutney Duncan, Ken Hurst Jet Propulsion Laboratory, California Institute of Technology

⁶ <https://www.sciencealert.com/here-s-what-would-happen-if-solar-storm-wiped-out-technology-geomagnetic-carrington-event-coronal-mass-ejection>

Conrad C. Lautenbacher, Jr.

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Career Chronology

Overview: (one page version)

Scientist: B.S., U.S. Naval Academy, major in Mathematics and Physics, 1964; Ph.D., Harvard University, Applied Mathematics, 1968. Innate love of mathematics, physics, and engineering in general. Throughout my career I have relied on my scientific training and education to seek the truth foremost and to develop unique and cutting edge solutions to life's challenges.

Naval Officer: In particular a Surface Warfare Officer with sub specialties in Operations Research and Financial Management. 40 years of service from entry into the U.S. Naval Academy to retirement from active duty as a Vice Admiral and Deputy Chief of Naval Operations.

Educator: Never held a formal position, but have been a guest lecturer numerous times at each of the nation's War Colleges, the Naval Academy, and the Naval Postgraduate School among others. Brookings Institution Fellow. Devoted time and energy in every position held to the education of those that follow. I enjoy teaching and am an enthusiastic advocate of education.

Environmentalist: As the President of the Consortium for Oceanographic Research and Education (CORE), and the Administrator of the National Oceanic and Atmospheric Administration (NOAA), I have lead major efforts in earth and environmental sciences. Strong advocate for sustainable use of earth resources and management of human activities to minimize the human footprint and promote healthy ecosystems.

Experienced Manager: Managed projects at every level and well versed in setting and meeting cost, schedule, and performance goals. I have managed complex infrastructure including the world's largest naval installation, Naval Station Norfolk. Well acquainted with what it takes to maintain successful facilities, human capital, and financial operations.

Proven Executive: I have led many different types of organizations of all sizes and purposes. Within the government, from command of a destroyer, to the U.S. Third Fleet, to federal agency head; in the civilian section, Chairman of the Board of USBA (insurance company), to President of CORE, and president of my church congregation.

Government Practitioner: Particularly when it comes to the federal bureaucracy. I have served at every level in the Washington arena from lower staff levels to Senate confirmed federal agency head. I am a student of organizational structures both government and private, as well as leadership and management of organizations that must accomplish complex missions under difficult or close to impossible conditions. I know how it works (and how it doesn't work)!

Career Positions

Chief Executive Officer, GeoOptics, Inc	2012-current
Vice President, Science Programs, ATG, CSC	2009-2012
President, CEREBRUM, Inc.	2008-current
Undersecretary of Commerce for Oceans and Atmosphere, and Administrator of the National Oceanic and Atmospheric Administration (NOAA), Department of Commerce	2001-2008
President and CEO, Consortium for Oceanographic Research and Education (CORE)	2001-2001
President, CEREBRUM, Inc. (Self Incorporated Company)	2000-2001
Deputy Chief of Naval Operations for Resources, Warfare Requirements, and Assessments (N-8)	1997-2000
Chairman of the Board, United Services Benefit Association	1996-1999
Director, Office of Program Appraisal, Department of the Navy	1996-1997
Commander U.S. Third Fleet, Department of the Navy	1994-1996
Director, Force Structure, Resources & Assessment (J-8), Joint Staff	1991-1994
Commander, Cruiser Destroyer Group Five, U.S. Pacific Fleet	1990-1991
Deputy Chief of Staff for Management and Inspector General, U.S. Pacific Fleet	1988-1990
Commanding Officer, Naval Station Norfolk, U.S. Atlantic Fleet	1986-1988
Assistant for Strategy, Chief of Naval Operations Executive Panel and Long Range Planning Staff	1983-1984
Federal Executive Fellow, Brookings Institute	1982-1983
Commanding Officer, USS HEWITT (DD-966), U.S. Pacific Fleet	1980-1982
Assistant for Programs, Chief of Naval Operations Staff, Directorate for Systems Analysis	1977-1980
Executive Officer, USS BENJAMIN STODDERT (DDG-22), U.S. Pacific Fleet	1975-1977
Personal Aide to the Vice Chief of Naval Operations	1974-1975

Aide and Flag Lieutenant to the Commander in Chief, U.S. Naval Forces Europe	1973-1974
Cost Analyst, Assistant Secretary of Defense for Systems Analysis, Department of Defense	1971-1973
Weapons Officer, USS HENRY B. WILSON (DDG-7), U.S. Pacific Fleet	1969 - 1971
Student, Fleet Anti-Submarine Warfare (ASW) and Tartar Missile Schools, U.S. Pacific Fleet	1969-1969
Navigator, USS HENRY B. WILSON (DDG-7), U.S. Pacific Fleet	1968- 1969
Graduate Student, Division of Engineering & Applied Physics, Harvard University	1964-1968
"M" Division Junior Officer, USS WASP (CVS-18), US Atlantic Fleet	1964-1964
Midshipman and Student, United State Naval Academy	1960-1964
Mail Clerk, S.L.Allen Co.	1960-1960
Administrative Assistant (Secretary), Remington Rand Corporation,	1960-1960

Position Descriptions

Title: Chief Executive Officer (CEO)

2012-current

Organization: GeoOptics, Inc

Relevant Experience:

Reporting to the Chairman of the Board, he is engaged in all activities necessary to the formation and management of a startup company with the mission of building, launching, and operating satellites on a commercial basis. The business model of the company is based on selling weather data by licensing arrangements to the U.S. Government and national governments worldwide. He is involved in all aspects of fund raising, management, and organizing a company in the process of being formed and capitalized. His experience in NOAA which includes the US National Weather Service is particularly relevant.

Title: Vice President, Science Programs, Advanced Technology Group

2009-2012

Organization: CSC

Relevant Experience:

Reporting to the President of the Applied Technology Group (ATG), he is engaged in building CSC expertise to expand business opportunities in science and technical support operations, and to augment their current portfolio of operations, maintenance, and support of government bases, training, and test ranges. His background in both policy development and science in ocean, atmospheric, space, climate, and environmental matters, makes him ideally suited for this role. Future successful service and support to public sector operations in a wide variety of areas such as energy, transportation, agriculture, and national security will depend more and more on greater use and incorporation of earth science applications. Of particular interest is the impact of environmental change on the need for incorporating renewable energy sources, and employing cutting edge technologies to provide sustainable means and methods for public sector operations in a rapidly changing world.

Title: Undersecretary of Commerce for Oceans and Atmosphere, and Administrator of
the National Oceanic and Atmospheric Administration (NOAA)

2001-2008

Organization: U.S. Department of Commerce

Relevant Experience:

A Senate Confirmed position in charge of a major federal agency, NOAA, with approximately 13,000 employees and a budget of approximately \$4 Billion. In charge of the nation's Weather Service, Ocean Service, Fisheries Service, Satellite and Data Service, and Ocean and Atmospheric Research. NOAA also manages the nation's seventh uniformed service, the NOAA Corps, and directs a fleet of Oceanographic research and survey ships as well as an air arm which includes hurricane hunters. Offices are nationwide including Alaska, Hawaii, and Trust territories. Responsibilities include leading roles in developing and implementing

international treaties and playing key roles in international organizations, federal interagency coordination, and close cooperation with State and local entities. Significant dialogue is maintained with private industry, a variety of NGOs encompassing environmental advocates and private enterprise, educational institutions as well as the general public.

Initially conducted a major review of the NOAA structure, processes, and resources, which resulted in a comprehensive reorganization and the development of specific mission goals to prepare for national and international leadership on the most pressing environmental and economic issues under the Agency' purview. Long range planning for operations and research; five year programming, budgeting, and execution; matrix management, a new strategic plan, concerted outreach with stakeholders and the general public, leadership in interagency and international issues were introduced and became the standard.

Specific accomplishments include spearheading the national effort to create a Global Earth Observation System of Systems (GEOSS) and the creation of the intergovernmental Group on Earth Observations (GEO) with a now permanent secretariat in Geneva and consisting of 73 nations and 52 International (UN) organizations. Devised the current federal organizational structure for managing climate change science and technology; also created a mission goal and organizational structure within NOAA to improve the level of science and research activity. Activity from this initiative helped form the foundation of the current IPCC reports. Led successful efforts to create the world's largest marine protected area: the Northwest Hawaiian Islands Marine National Monument. Initiated major effort to move from single species management of fisheries to ecosystem based approaches. (More available if needed.)

Title: President and CEO

2001-2001 (10 months)

Organization: Consortium for Oceanographic Research and Education (CORE)

Relevant Experience:

Directed a Washington based national organization of approximately 60 Universities and Aquaria engaged in higher education and research in Oceanography. Managed a staff of 20 with a yearly budget of approximately \$3 Million. Organized and developed common positions for outreach to the public and to specific funding sources for the membership. Major projects included defining a common view of an Integrated Ocean Observing System and gaining wide ranging support for the concept, improving basic research budgets for the membership, and directing a campaign to improve ocean literacy.

Title: President

2000-2001

Organization: CEREBRUM, Inc. (Self Incorporated Company)

Relevant Experience:

Management Consultant engaged in developing business strategies for major defense contractors. Worked primarily with Technology, Strategies & Alliances, Inc. Major project

with Boeing Corporation on the way ahead for National Missile Defense involving all aspects of program management including system expansion and integration, pace of technology introduction, testing, simulation, and reliability, cost and schedule, and industrial partnerships.

Title: Deputy Chief of Naval Operations for Resources,
Warfare Requirements, and Assessments

1997-2000

Organization: Department of the Navy

Relevant experience:

Directly responsible for the development of the Navy's \$80 Billion annual budget and accompanying Five Year Program. In charge of building, validating and prioritizing all requirements for the size, structure, capitalization and operations of the U.S. Navy. Responsible for introduction and proper phasing of latest technologies across the Navy including introduction into major capital investments. Chairman of panel responsible for development and introduction of all technologies in the code word classified arena. Exposed to and conversant with latest developments in information technology, communications, computing, remote sensors, propulsion, real time command and control, robotics and satellite technology among others. Strong proponent and sponsor of integrated power systems, electric drive, reduced manning, automated systems, and distributed support architectures. Director of cost benefit analysis for all elements of the Navy Budget.

Title: Chairman of the Board

1996-1999

Organization: United Services Benefit Association

Relevant Experience:

A private sector position not connected with the Navy. Gained broad exposure to top level decision making. Served as member of the Board for three years and then was then selected to serve as the Chairman for an additional three years. The United Services Benefit Association is a private, not-for-profit insurance and financial services institution. Led this organization through a period of major change, including the hiring of a new CEO and the creation of a new strategic plan for a changing market.

Title: Director, Office of Program Appraisal

1996-1997

Organization: Department of the Navy

Relevant experience:

Senior uniformed advisor to the Secretary of the Navy on strategic planning including introduction of technology, current and future budgets, and resource allocation. Coordinator of

program policy between the Navy and the Marine Corps; architect of Department of the Navy positions on the full spectrum of resource allocation issues, including operating versus capital accounts, and the cost, schedule, and pace of technology insertion. Worked effectively to introduce new ship development technology including ultra-automation, remotely controlled functions, and the latest in stealth technology and propulsion systems. Strong proponent of Unmanned Air Vehicles (UAVs) and the introduction of robotics.

Title: Commander U.S. Third Fleet

1994-1996

Organization: Department of the Navy

Relevant experience:

In charge of training and operating approximately one half of the United States Navy. Responsible for defense of the sea approaches to, and the Pacific coast of the United States. Designated Joint Force Commander for missions as determined by the Commander-in-Chief Pacific. Architect of plan to adapt the latest in information technology to revolutionize sea based command and control. Visualized and initiated project to build and introduce the concept of a sea based battle lab for the latest in electronic, computing and communications technologies. The command ship, USS CORONADO was officially designated as the Navy's "Sea Based Battle Laboratory" by the Secretary of the Navy (see accompanying San Francisco Chronicle article). Introduced Joint training in the Pacific Theater. Highly successful in gaining cooperation and building a partnership with all military services to participate in new and more effective ways of training in a high tech era. Sponsored and introduced the use of the latest modeling and simulation techniques to improve and reduce the cost of training.

Title: Director, Force Structure, Resources & Assessment

1991-1994

Organization: Joint Staff

Relevant experience:

Reported to the Chairman of the Joint Chiefs of Staff as principal planning officer for the size and composition of current and future Department of Defense force structure; principal advisor to the Vice Chairman of the Joint Chiefs of Staff on programs, budget, and capital system development and procurement. Managed a division composed of experts in acquisition, systems analysis, information technology, modeling and simulation, and other relevant technologies. Working directly for Generals Colin Powell and subsequently John Shalikashvili, played instrumental role as the architect of future military forces, sized and equipped for the new post cold war and high tech era. Personal advisor to Admiral David Jeremiah, Vice Chairman and to General Colin Powell, on the requirements, the force structure, the technologies, and the pace of introduction needed to build tomorrow's successful military forces.

Title: Commander, Cruiser Destroyer Group Five

1990-1991

Organization: U.S. Pacific Fleet

Relevant experience:

Executive in charge of operations and training for 15 ships with attendant staffs and personnel; Deployed to Saudi Arabia with additional duties as Commander U.S. Naval Forces Central Command, Riyadh, during Operations Desert Shield and Desert Storm. Functioned as the deputy Naval Component Commander and was in charge of daily operational planning for Navy participation in the Air War. Daily contact with General Schwarzkoff in planning and executing all Naval Forces assignments in the conduct of the Gulf War. Architect of command, control and information flow system developed on the fly to ensure coordination and efficient use of Navy Carrier Air and land based Air Force Squadrons in a very effective air campaign. First hand knowledge gained on networking, data management and information flow, which was later used in the design of the USS CORONADO, "command ship of the future", and in building the concepts for "IT 21" and "Network Centric Warfare".

Title: Deputy Chief of Staff for Management and Inspector General 1988-1990

Organization: Pacific Fleet Staff

Relevant experience:

Principal assistant to the Commander in Chief Pacific Fleet for developing and executing the Pacific Fleet operating budget (~\$5Billion), administering the human resources system (~170K personnel), and oversight of several infrastructure functions such as security, and inspection of facility management. Oversight of Engineering standards, maintenance, and inspection throughout the Pacific Fleet, including all nuclear and non-nuclear propulsion, and auxiliary systems (steam, gas turbine, diesel, electric).

Title: Commanding Officer, Naval Station Norfolk 1986-1988

Organization: U.S. Atlantic Fleet

Relevant experience:

Executive in charge of world's largest naval base, providing support and services for over 100 ships and 100,000 personnel. Led organization with 2000 personnel. Responsible for the entire range of installation functions including such items as waterfront operations, police and fire protection, dormitory and lodging management, recreation, facilities maintenance, industrial safety, and environmental protection. Architect of system improvements in service and cost effectiveness in all areas principally facilitated by the introduction of cutting edge information technology into the management and support structures.

Title: Chief of Programming Branch 1984-1986

Organization: Chief of Naval Operations Staff, Directorate for Programming

Relevant experience:

Responsible for building the Navy Five Year Program at the budget detail level, including operating budgets, capital accounts, research and development, and technology introduction. Drafted and sponsored the five year ship and aircraft building plans. Led efforts to bring automated systems, improvements in propulsion, and latest sensors for weapons systems into the program and budget. Exposed to and gained significant detailed knowledge about the wide variety of research and development, capitalization and operating programs across the Navy. Led the team that judged and prioritized navy programs to ensure effective use of limited resources.

Title: Assistant for Strategy

1983-1984

Organization: Chief of Naval Operations Executive Panel and Long Range Planning Staff

Relevant experience:

Personal advisor to the Chief of Naval Operations (CNO) on Program, Budget, Long Range Planning, strategy, and war gaming initiatives. Served as one of several executive secretaries to the CNO Executive Panel, a group of successful private sector leaders in technology, which advises the Navy leadership on the direction to follow in technology investment and transition. Numerous direct contributions to significant program and strategy decisions made the CNO.

Title: Federal Executive Fellow

1982-1983

Organization: Brookings Institute

Relevant experience:

Research fellow engaged in examining all aspects of education, training, recruiting and retention of military manpower. Particular emphasis on the levels of aptitude, training and experience required to keep pace with the technology requirements of a rapidly changing Navy, from nuclear power to electronics and computers. Authored detailed paper on "Manning the 600 ship Navy".

Title: Commanding Officer, USS HEWITT (DD-966)

1980-1982

Organization: U.S. Pacific Fleet

Relevant experience:

Captain of a Spruance class destroyer, responsible for training, morale, and welfare of crew of 330, and the maintenance of all equipment and safe operation of a ship with replacement value of \$1B equipped principally for Anti-Submarine and Surface Warfare. Deployed to the Indian Ocean and Northern Arabian Sea for six months. Commanded one of the first gas turbine propulsion destroyers with advanced technologies in computer systems, information technology, remote sensors and automated systems through the ship.

Title: Assistant for Programs

1977-1980

Organization: Chief of Naval Operations Staff, Directorate for Systems Analysis

Relevant experience:

Strategic planner in charge of the process for development of the Navy Five year plan. Developed the extended planning annexes covering five to fifteen years in the future. Had the opportunity to influence directly the course of system development and insertion of relevant new developments into the mainstream of the future Navy. For example, a vocal and successful proponent for the elimination of steam propulsion systems and introduction of gas turbine technology into the Navy.

Title: Executive Officer, USS BENJAMIN STODDERT (DDG-22)

1975-1977

Organization: U.S. Pacific Fleet

Relevant experience:

Second in command of a Navy Guided missile Destroyer with 340 officers and enlisted crew. Qualified as 1200 psi steam engineer – most complex propulsion system ever developed by the US Navy. First ship in Pacific Fleet to pass highly exacting engineering inspections put in place to remedy the safety and maintenance issues that had evolved over the previous decade of overuse during the Vietnam War. Completed major overhaul of all engineering main propulsion, weapons and electronic systems six weeks early and under budget. Expended considerable effort with direct personal involvement in repairs, reassembly and crew training in the main propulsion, electrical generating, and auxiliary engineering systems.

Title: Personal Aide to the Vice Chief of Naval Operations

1974-1975

Organization: Department of the Navy, Chief of Naval Operations Staff

Relevant experience:

Personal Assistant to the second ranking officer in the U.S. Navy. Broad Exposure to U.S. Navy issues at the corporate level. Ample opportunity to input directly to the top regarding just about every aspect of program, budget, technology, system development, policy, and human resource issues.

Title: Aide and Flag Lieutenant to the Commander in Chief

1973-1974

Organization: U.S. Naval Forces Europe

Relevant experience:

Personal assistant to the four star flag officer commanding U.S. Navy forces deployed and stationed in the European and Middle Eastern areas. Broad exposure to European issues including US defenses policy, NATO, as well as business and commercial relations. Traveled to almost every European and Middle Eastern country from Great Britain to Iran.

Title: Cost Analyst, Assistant Secretary of Defense for Systems Analysis 1971-1973

Organization: Office of the Secretary of Defense

Relevant experience:

Responsible for developing cost models and independent cost estimates of major ship and aircraft research and development, and procurement programs. Became proficient in all aspects of aircraft and ship development technology. Visited major manufacturing and technology centers gaining understanding of cutting edge electronic, propulsion, materials, and fabrication technologies. Personally authored and wrote software for models to predict the costs and schedule of development and transition of relevant technology, and the manufacture of capital assets featuring those technologies. Founding partner of the Coast Analysis Improvement Group (CAIG); results included major advances in ensuring accurate initial estimates for major systems procurements. Was the remedy for the public outcry concerning cost overruns on the F-111 and C-5 aircraft.

Title: Weapons Officer, USS HENRY B. WILSON (DDG-7)

1969 - 1971

Organization: U.S. Pacific Fleet

Relevant experience:

Department Head position (one of four on the ship) responsible for all weapons systems. In charge of 5 officers and 95 enlisted men, directly responsible for the maintenance and operation of two 5"/54 gun systems, the sonar and anti-submarine rockets and torpedoes launching systems, and the Tartar surface to air missile battery. Proficiency gained in the practical understanding and maintenance of large scale electrically and hydraulically driven equipment, internal data and communications networks, sensor systems (radar, sonar, and electronic, active

and passive), computer electronics, and systems integration. Participated in a major ship yard repair period (1-year) where all equipment under my supervision underwent major tear down and rebuild; participated in two western Pacific cruises with duty off the coast of Vietnam. All members of the crew were awarded the Combat Action Ribbon as a result of taking hostile fire from North Vietnamese shore batteries. Also personally awarded the Navy Achievement Medal with Combat "V", The Meritorious Unit Commendation, and the Vietnamese Meritorious Unit Commendation.

Title: Student, Fleet Anti-Submarine Warfare (ASW) and
Tartar Missile Schools

1969-1969

Organization: U.S. Pacific Fleet

Relevant experience:

Studied ocean physics, the theory, maintenance and operations of underwater sensors and weapons systems, as well as wartime tactics in ASW. Winner of the ADM John H. Sydes Award for the highest standing in the course which included both academic as well as practical proficiency. Studied in detail the design, system engineering, operation and maintenance of the Navy's most advanced Anti-Air Warfare (AAW) missiles systems including radar, analog and digital computers, weapons control systems, booster propulsion, and missile guidance. Also graduated number one in that class.

Title: Navigator, USS HENRY B. WILSON (DDG-7)

1968- 1969

Organization: U.S. Pacific Fleet

Summary:

Responsible for the safe navigation of the ship, as well as all administrative and personnel functions of a 300 man Navy Guided Missile Destroyer. Became expert in both celestial and electronic means of navigation, learning first hand the practical application of classroom work in spherical trigonometry. Sailed the range of the Pacific Ocean from San Diego to Southeast Asia, northern and southern hemispheres as well. Became expert in positioning the ship for shore bombardment missions off both the North and South Vietnam coasts.

Title: Graduate Student, Division of Engineering and Applied Physics

1964-1968

Organization: Harvard University

Relevant experience:

Worked under the Committee of Applied Mathematics. Program included courses taught by the Physics Department, the Division of Engineering and Applied Physics, and the Committee on Applied Mathematics. This was a program strong in engineering fundamentals with course work and emphasis on practical mathematical applications to problem solving in a wide variety of disciplines including fluid mechanics, solid mechanics, electromagnetic theory, thermodynamics, relativistic mechanics, meteorology, oceanography, quantum theory, and computational science. Thesis titled "Gravity Wave Refraction by Islands, dealt with the inundation to be expected on islands from tidal waves, properly known as Tsunamis. Solution of the problem was one of the pioneering efforts to solve fluid mechanical equations of motion by the use of large scale digital computing. Additional work was accomplished in both theory and experimentation on the collision of fluid droplets, part of a larger effort to understand and predict the physical conditions immediately following the injection of liquid fuel into a combustion chamber. Both a Masters of Science and Ph.D. obtained in roughly three and ½ years.

Title: "M" Division Junior Officer, USS WASP(CVS-18)

1964-1964

Organization: US Atlantic Fleet

Relevant experience:

Largest division on the ship, approximately 200 men, and responsible for the main propulsion and electrical power generation. Duties included maintenance and repair actions as well as the smooth and reliable operation of the main engines and electrical generators. Began initial qualifications as a certified steam propulsion engineer, which included detail knowledge of all main engineering and auxiliary systems on the ship (a small aircraft carrier). Participated directly in tearing down and repairing large scale machinery; learned many valuable lessons on the need for strict engineering maintenance and operating standards, as well as what needed to be changed in the future.

Title: Midshipman and Student.

1960-1964

Organization: The United State Naval Academy:

Relevant experience:

Enamored with anything related to science and engineering, I majored in mathematics and physics as well as taking courses in the mainstream engineering disciplines: electrical engineering, mechanical engineering, fluid mechanics, thermodynamics, chemistry, nuclear engineering, strength of materials, structural dynamics, computer fundamentals. I graduated 5th in a class of 830 (we started with 1200). Sports included soccer and swimming at the JV level; music interests continued. As a senior, I was the Drum and Bugle Corps Commander, the Midshipman Concert Band Director, and appeared on the TV program Hootenany (Bluegrass banjo player with the four man Naval Academy folk group known as The Anchormen). Was awarded the Admiral William S. Sims Leadership prize at graduation.

Title: Mail Clerk

1960-1960

Organization: S.L.Allen Co.

Relevant experience:

Delivered all incoming as well as posted all outgoing plant mail. Walked the entire plant 4 times a day. Observed the manufacture of Flexible Flyer Sleds, and Planet Jr. Farm Equipment. Spent significant portion of time on the production floor, fascinated with large scale forging and stamping machinery, and product assembly.

Title: Administrative Assistant (Secretary),
Engineering Maintenance Department

1960-1960

Organization: Remington Rand Corporation, UNIVAC Division.

Relevant experience:

Sole secretary and clerk for an electrical fabrication and maintenance group of 70 people. Gained appreciation for the "new" field of digital computing. Watched the building and assembly of The LARC III computer, a vacuum tube and electrical monster specially built for the Los Alamos Research Center. Spent spare time pestering the engineers and designers who were working on the various computer systems.

Other experience:

CEREBRUM, Inc. (self-incorporated consulting)	President	1/01 – present
KellyAnderson, Inc	Consultant	11/08 – 3/09
Technology, Strategies & Alliances	Consultant	10/00 – 12/01
Electronic Warfare Associates, Inc	Consultant	10/00 – 12/01
Systems Planning & Analysis Group, Inc	Consultant	12/00 – 12/01
Symmetron, Inc	Consultant	1/01 – 12/01
Westinghouse Government Services Corp	Consultant	2/01 – 12/01
Northrop Grumman Corp	Consultant	4/01 – 12/01

Bethlehem Lutheran Church

Congregation President

7/04 – 6/08

Boards:

OMEGA Biofuels, Inc	1/11 – present
Wyakin Warrior Foundation Board	4/10 – present
Iridium Government Advisory Board	4/10 – 6/11
Southeast Coastal Ocean Observing Regional Association(SECOORA)	9/09 -- present
GeoOptics	7/09 -- present
Prohias LTD Advisory Board	1/09 -- present
The Georgia Aquarium	12/08 -- present

AccuWeather, Inc		11-08 – present
Citizens for Affordable Energy		11-08 -- present
U.S. Naval Order		6/98 – 6/99
United Services Benefit Association	Chairman	9/96 – 9/99
United Services Benefit Association		9/92 – 9/96
U.S. Naval Institute		9/92 – 8/94

Study Groups/Workshops:

Defense Science Board panel on High Energy Lasers,	10/00 – 6/01
Space Studies Board (SSB), National Research Council: International Space	
Cooperation and Competition in a Globalizing World	11/08

Memberships:

American Geophysical Union	2009 – present
American Meteorological Society	2008 – present
Marine Technology Society	2002 – present
Naval Historical Society	2000 – present
Navy League of the United States	2000 – present
Central High School Alumni Association	1997 – present
Order of the Carabao	1996 – present
U.S. Naval Order	1995 – present
Military Order of the World Wars	1995 – 1996
AARP	1992 – present
U.S. Naval Academy Alumni Association	1968 – present
U. S Naval Institute	1964 – present

Honors and awards:

Military Service:

Defense Distinguished Service Medal
 Distinguished Service Medal with two Gold Stars in lieu of subsequent awards
 Legion of Merit with three Gold Stars in lieu of subsequent awards
 Meritorious Service Medal with two Gold stars in lieu of subsequent awards
 Navy Commendation Medal
 Navy Achievement Medal with Combat “V”
 Combat Action Ribbon
 Navy Unit Commendation
 Meritorious Unit Commendation with one Star
 Navy Expeditionary Medal
 National Defense Service Medal with one Bronze Star
 Armed Forces Expeditionary Medal
 Vietnam Service Medal with three Bronze Stars
 Southwest Asia Service Medal with Three Bronze Stars
 Humanitarian Service Medal
 Sea Services Ribbon with two Bronze Stars
 Republic of Vietnam Gallantry Cross Unit Citation

Kuwait Liberation Medal (Kuwait)
Kuwait Liberation Medal (Saudi Arabia)

Other:

Ocean Conservation Award	Aquarium of the Pacific	6/08
Award for the Advancement of International Cooperation	American Astronautical Society (2005)	3/05
Public Service Award	National Fisheries Institute	10/04
Compass Distinguished Achievement Award	Marine Technology Society	3/03
Central High School Hall of Fame (Philadelphia)		6/99
Man of the Year	Norfolk Chamber of Commerce	6/86
Federal Executive Fellow	Brookings Institution	8/82 – 9/83

Published writings:

Magic Moments, Boys Life Magazine, May 1959
Magic Moments, above article reprinted in One Nation Under God, ed. Robert Gordon Smith, Wilfred Funk, Inc. New York, NY 1961
Collision of Fluid Droplets, Harvard Technical Report No. 2, National Sciences Foundation Grant GK-165, Cambridge, MA May 1966
Gravity Wave Refraction by Islands, Thesis, Harvard University, December 1967 Cambridge, MA
The Presidents Own, Marine Corps Gazette, November 1968
Gravity Wave Refraction by Islands, Journal of Fluid Mechanics, Cambridge, UK, May 1970
Earth Day Should be Ocean Day, CORE Press Release reprinted in various Ocean Science organizational newsletters, April 2001
New Issues for NOAA in the New Century, Sea Technology, January 2002
N.E. Fishing: Success Stories, Letter to the Editor, Boston Globe, February 2, 2002
Past, Present, Future of Communications, Editorial, Sea Technology, May 2002
The Hot Pulse of the Cold Sea, Letter to the Editor, The Washington Times, June 9, 2002
NOAA Helps Us Get to Know Our Planet, Commentary, Seattle Post-Intelligencer, August 14, 2002
Doing Something about the Weather, Letter to the Editor, The Washington Post, October 5, 2002
U.S. Backs Science over Kyoto, Commentary, New Zealand Herald, November 30, 2002
NOAA's New Look: Managing in the 21st Century, Sea Technology, January 2003
The World Needs a New Focus on Climate, Commentary, Los Angeles Times, February 10, 2003
Celebrating Earth Day by Caring for the Sea, Commentary, New Bedford Standard Times, April 22, 2003
The Ocean in the Spotlight for Earth Day, Commentary, Orangeburg Times and Democrat, April 22, 2003
Commentary to MTS Members at the US Naval Observatory, Marine Technology Society Journal, Vol. 37, No. 2
Taking Nature's Pulse – All over the Globe, Commentary, Marine Technology Society Journal, Vol. 37, No. 3
New Facility Aids Fish Studies, Opinion, Salem Statesman Journal, November 17, 2003

A Strategic Approach to Managing Oceans, Global Issues, U.S. Department of State, Vol. 9, No. 1, April 2004
Charleston Will be a Key Link in Emerging Earth-monitoring System, Op-Ed, Charleston Post and Courier, May 10, 2004.
The Bush Administration Isn't Ignoring Climate Change, Business Week Online, August 2, 2004
Air Study Will Benefit Region, Portsmouth Herald, Letters to the Editor, August 17, 2004 (Seacoastonline.com, August 17, 2004)
Salmon, Letters to the Editor, Seattle Post-Intelligencer, September 19, 2004
Building an Earth Observation System, Comment, Geotimes, American Geological Institute, November, 2004
Commitment to Salmon 'Historic', Letters to the Editor, The Oregonian, December 2, 2004, (Oregonlive.com)

Shaping Ocean Policy for the Next Generation, Commentary, Marine Technology Society Journal, Vol. 38, No. 4.
Ocean Issues Reaching High Tide, Sea Technology, January 2005
On Monday, A Champion Will Be Crowned in Biloxi, The Sun Herald, April 23, 2005. (SunHerald.com)
Tsunami Warning Systems, The Bridge, National Academy of Engineering, Summer 2005
Offshore Aquaculture Key to Nation's Nutrition, Independence, North County Times, June 18, 2005
Offshore Aquaculture in Our Future, Commentary, The Providence Journal, June 22, 2005
Aquaculture Act Will Create Standards For Fish Farming, The Honolulu Star Bulletin, July 5, 2005. (Starbulletin.com)
One World, Interconnected, Editorial, Sea Technology, September 2005
Bleak Picture of NOAA Based on Old Information, Letters to the Editor, Florida Today, October 26, 2005. (floridatoday.com October 10, 2005)
Weather Service Fulfills Its Mission to Protect Life and Property, Herald Tribune, October 28, 2005. (heraldtribune.com)
Report Relied on Outdated Information, St. Petersburg Times, October 28, 2005. (St.Petersburg Times Online Tampa Bay)
National Weather Service Provides Clear Results, Salt Lake Tribune, October 10, 2005.
More Accurate Forecasts Save Thousands of Lives Each Year, Sun Herald, October 29, 2005. (SunHerald.com)
Technology Enhances Forecast Quality, The Miami Herald, October 30, 2005. (Herald.com)
Weather Service Defends Record, The Bradenton Journal, October 31, 2005. (Bradenton.com)
What can Be Done with Derelict Dams?, The Providence Journal, December 19, 2005. (projo.com)
Oceans Make Big News in 2005, Sea Technology, January 2006
Tempest in a Tea Pot, The New Republic, March 13, 2006
We're Funding Climate Science, Not Muzzling It, Letters to the Editor, The Washington Post, April 19, 2006
2006 – A Milestone Year for Earth Observations, Sea Technology, January 2007
Aquaculture Bill Makes Sense for United States, Keynoter.com, March 16, 2007
Aquaculture to the Rescue, The Washington Times, March 18, 2007. (washingtontimes.com)
The Promise of Offshore Aquaculture, The Providence Journal, March 20, 2007 (projo.com)

U.S. Aquaculture Vital in Global Market, The Boston Globe, March 26, 2007. (Boston.com)
The Economy and the Environment: Assessing the Environmental and Economic Benefits of Aquaculture, Harvard College Economics Review, Spring 2007, Vol I Issue 2, p. 35
Keeping an Eye on the Planet, Commentary, Aerospace America, American Institute of Aeronautics and Astronautics, August 2007
NOAA's Priorities, Space News, November 2007
Flexible Instrument, Our Planet, United Nations Environmental Program (UNEP), December 2007
Great Climate Awareness Ushers in New Ocean Era, Sea Technology, January 2008
Predicting Droughts, Letters to the Editor, State Legislatures, April 2008
NOAA: Observing Locally, Forecasting Globally, Defender, 2008, Vol. IV, Issue 2
Ocean and Atmosphere – The Future, BioScience, May 2009, Vol 59 No. 5
Climate Change and National Security – Parts of a Whole, Aerospace America, American Institute of Aeronautics and Astronautics (AIAA), June 2009, pg. 26
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Earth Observation and Sustaining the Wilderness, International Journal of Wilderness, December 2009, Vol. 15 No. 3, Pg. 11
Better Weather Forecasting at a Lower Cost, Wesley K. Clark and Conrad C Lautenbacher Jr, SpaceNews.com, January 20, 2010
Natural Disasters and Solar Storms – Why Space Weather Matters, Huffington Post, January 28, 2010
Global Observation and Systems Engineering, Insight, International Council of Systems Engineering (INCOSE), September 2011, Vol. 14 Issue 3, pg 16